

# Science News-Letter

*The Weekly Summary of Current Science*

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PSYCHOLOGY

## Geniuses of History Get Intelligence Ratings

By EMILY C. DAVIS

Can you imagine 300 of the world's most famous men and women from the year 1450 up to 1850 collected in a school room, and then all 300 of them reduced to childhood by some Alice-in-Wonderland magic? If you can picture this scene of famous boys and girls, perhaps you can drive your imagination a step farther and fancy the famous 300 being given an intelligence test, so that they can be rated according to their mental development.

At the end of the test, John Stuart Mill, who is destined to become a celebrated English philosopher, is politely requested to please walk up to the head of the class. Next in line are called young Goethe, who is to be one of Germany's greatest poets; Grotius, who will become a great Dutch theologian and will found the science of international law; and Leibnitz, who will shine as a remarkable mathematician. And so on, down the line, with Milton, Napoleon, Raphael, Dickens, and the rest taking their rank.

This dramatic scene can never take place in a literal sense. These master minds of history have escaped forever from the modern trial of doing mental arithmetic to a stop watch, and answering questions cunningly devised to show whether they can reason logically. But the 300 have not entirely eluded the resourceful testers. The test scene has been arranged, in effect, with the aid of old records and by use of the very recent science of historiometry.

Historians have always recorded what stories they could find about the youthful achievements and shortcomings of geniuses. We are told that Swift at three years could read any chapter in the Bible. Mozart composed a minuet at the age of five.

The poet Tasso spoke at six months and at seven years "was pretty well

acquainted with the Latin and Greek tongues." Farragut fought in the War of 1812 and commanded a boat at the age of eleven. Little Oliver Goldsmith was the despair of the mistress of the dame school who said "never was so dul' a boy"; yet Oliver's sister, who saw another side of him, said that he exhibited signs of genius at an age when he could scarcely write.

Now, by studying the best accounts of childhood and comparing them with standards of mental development shown in living boys and girls, psychologists are able to rate the historic characters roughly in mentality.

This difficult task in historiometry has been accomplished for 300 geniuses whose childhood has been recorded in sufficient detail, by Dr. Catherine M. Cox, working at Stanford University, California. Dr. Cox was assisted by Dr. Lewis M. Terman, professor of psychology, who

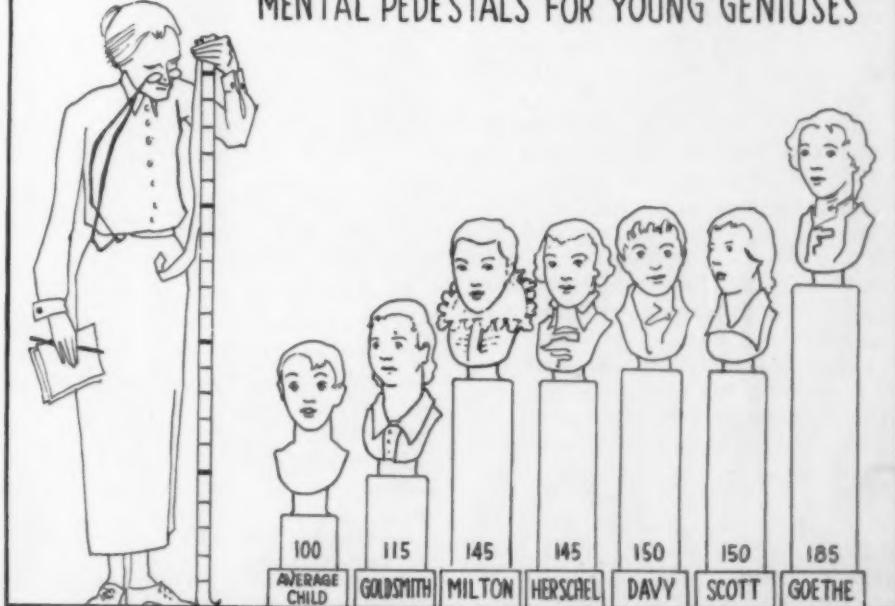
recently studied the mentality of 1,000 superior modern school children, and also by Ruth H. Livesay and Lela O. Gillan.

Libraries were scoured for reliable accounts of the childhood and youth of the 300. On the basis of the data obtained, each child was rated in intelligence and 67 character traits by three psychologists. And finally, the figures were put through statistical processes to show the degree of reliability of the figures. Four years were spent on the task, and the results have just been published at Stanford University in a large volume.

The psychologists have not been poring over old records and histories merely in order to appraise the geniuses of the past and to accumulate interesting information. Their aim was to find out whether genius reveals any significant traits in childhood. They hoped that these signs would be found

(Just turn the page)

### MENTAL PEDESTALS FOR YOUNG GENIUSES



## Intelligence of Geniuses

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plain enough, so that the gifted children of today can be taught more intelligently and given a better chance to do their best for the world.

The records collected about the famous children do show, what is so often disputed, that the great minds of the world almost always have showed signs of brilliance in childhood. The more complete the account of a famous man's boyhood, the greater the evidence that he was an unusual child.

Because of this fact, the intelligence ratings given to the famous characters are likely to be too low. Thus, John Stuart Mill, who stands at the top of the list of bright boys, deserves a high pedestal by right of remarkable achievements, but had the childhood of some other famous men been recorded in as much detail, Mill might have stiff competition for first place. In other words, Mill's rating is reasonably fair and accurate, while some of the other boys who didn't do so well on the intelligence score may not have put their best foot forward—in the biography books.

If we take a look at this Mill boy who outshines young Napoleon and Beethoven and Milton, we find him at the age of five holding an animated conversation with Lady Spencer on the comparative merits of Marlborough and Wellington. This might equal the ability of a kindergarten child of today who could discuss the ideals of Mussolini as compared with those of, say, President Wilson.

At six years Mill was writing a history containing such sentences as "the country had not been entered by any foreign invader," and using language typical of a twelve-year-old child. At eight John was giving Latin lessons and was held responsible for the errors of his pupil.

What this teaching performance means to a psychologist is shown by Dr. Cox's comment:

"Teaching a foreign language involves mastery of his own and the foreign idiom. Success depends in no small degree upon ready familiarity with a considerable vocabulary in each language. Mill's achievement indicates facility in comprehending and using new symbols and in substituting them for old ones; it is proof of the capacity to compare, abstract, and generalize, more characteristic of 16-year than 8-year intelligence. In connection with his teaching he expounded Latin grammar, Nepos, and Caesar's Commentaries, indicating thus

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## STUDY HELPS FOR SCIENCE CLASSES

These articles will be found to be especially useful in class work

### GENERAL SCIENCE

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(This will fit on a 3 x 5 card.)

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## News-Letter Features

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## Higher Power Cathode Rays

A super-power cathode ray tube, which will take much higher voltages than the tube which he demonstrated recently at the Franklin Institute, in Philadelphia, and which has attracted considerable scientific attention, is now planned by Dr. W. D. Coolidge, assistant director of the General Electric Company's research laboratory. The new form of the tube is described by Dr. Coolidge in the *Journal of the Franklin Institute*. This is the first complete article by Dr. Coolidge on his new work.

Briefly, the method which he proposes to use is to "cascade" two or more tubes, the rays from one being fed into another, which speeds them up still further and increases their range. The cathode rays are rapidly moving electrons, small particles of electricity, moving with speeds of a hundred thousand or more miles a second. These electrons start from a small electric light filament from which they come at speeds of merely a few miles a second. With a voltage of 350,000 they are speeded up within the tube, so that they leave it with a velocity of 150,000 miles a second. By building larger tubes, it will be possible to increase the voltage to a certain limit, but when too much power is applied to a single tube the cathode itself is bombarded by positive rays, which move in opposite directions to the cathode or negative rays. This introduces troublesome effects.

By arranging two or more tubes together so that the nickel window at the end of the tube, from which the rays ordinarily emerge into the open air, acts as the cathode of the next tube, they are already moving at great speed when they leave the first tube and when the same voltage is applied to the second tube they are still further accelerated. The window between the two tubes may be made thick enough so that it passes the cathode rays going in one direction, but stops the positive rays going the opposite way, as they are less penetrating. Another advantage of the multiple tube over a single very large one is that it is much easier to supply, for instance, four tubes with 250,000 volts each than one tube with a million volts.

Dr. Coolidge says that he will try out this arrangement of the tubes as soon as the development of the single tube has been pushed to as high a voltage as possible.

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EDWARD CURTIS FRANKLIN

## Forty Years of Chemistry

The friends and former students—and all his former students are his friends, which is more than can be said of most teachers—are to establish a Fellowship Fund for Franklin as an ever living memorial on the occasion of his retirement from the professorship of organic chemistry in Stanford University next spring.

If teaching consists, as is still commonly held, in pumping information under high pressure into a class full of unwilling brains, Franklin could not be called preeminent as a pedagogue. But if teaching consists, as it should, primarily in leadership and example, in showing the student what research means by doing research in his presence and lending a helping hand to a student when he is trying to do something for himself, then Franklin has always been a great teacher from the time when, as a student at the University of Kansas in the eighties, he became "the assistant" in chemistry to Professor E. H. S. Bailey while his brother, W. S. Franklin, now of Massachusetts Institute of Technology, was "the assistant" in physics.

Franklin's outstanding characteristic in the University of Kansas was his independence of thought and action. He thought things out with his own mind and worked them out with his own hands with very little dependence upon books. In fact he had not many books to depend upon, since the entire chemical library was contained in one small bookcase with two glass doors kept in the balance room.

(Just turn the page)

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## Indoor Traffic Lanes

Traffic lanes in factories, marked off on the floor with white and red lines, are proposed by M. R. Paul, color expert.

Following the white line indoors as well as out will promote speed and safety, he shows in a report to Industrial Psychology, because when the aisles in a busy shop are plainly indicated, they can be kept clear for traffic. For danger zones in factories he recommends red traffic lines to insure caution.

Piping systems in factories should be painted in colors to indicate whether the contents are dangerous to life or property, Mr. Paul states. A subcommittee of the American Engineering Standards Committee, of which Mr. Paul is a member, has worked out a system of colors for this purpose. A yellow pipe would indicate dangerous material; green, safe products; blue, protective material; purple, extra valuable material; and red, fire control equipment.

Use of a color system would, in the event of a leaking pipe, enable the foreman to know at once the general significance of the situation and whether to sound a general alarm.

In plants where the decorative effect is considered important he suggests that the pipes may be of the same color as the wall, with bands of color identifying them, painted at joints and a foot from the place where each pipe enters the wall, floor, or ceiling.

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## Rat Has Longevity Record

A rat without a thyroid gland has lived to what would correspond in man to the ripe old age of 82.

A record of the thyroidless rodent was kept by Dr. Frederick S. Hammett of the Wistar Institute in the process of collecting data on the part played by the thyroid gland in growth. The rat apparently managed to exist quite happily minus his thyroid for two years and eight months. Since three years is calculated to be about the maximum age limit for rats, which is practically equivalent to that of 90 years for man, this longevity record is considered remarkable.

The animal received no thyroid substance in the diet from the time the gland was removed until the time of his death, said Dr. Hammett.

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### Forty Years of Chemistry

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In 1890 he went to the University of Berlin, then the Mecca of every ambitious student, and three years later he earned his Ph.D. at Johns Hopkins. He continued as professor at the University of Kansas until 1903 when Stanford University enticed him away by the offer of a better liquid air machine. There he has since remained except for the war year of 1918 which he spent in Washington as consulting chemist of the Ordnance Department. He was made a member of the National Academy of Sciences in 1914, and was President of the American Chemical Society in 1923.

Franklin's career as a chemist is a striking example of what can be accomplished by choosing a fertile field of investigation and sticking to its cultivation with unflagging energy and persistence. For a quarter century he has concentrated his efforts on the study of liquid ammonia as a solvent and has proved that it acts very much like water in the solution of acids, bases and salts. These researches have opened a wider domain to the electrolytic theory and thrown new light upon the chemistry of nitrogen.

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Sixty species of bamboo are found in China.

The peanut is not a nut, botanically speaking.

The only part of poison ivy that is poisonous is the sap.

White elephants were known more than 2,000 years ago.

A wrist watch made into a cuff link is a recent innovation.

Cloth is made from pineapple leaves in the Philippines.

The calcium content of the blood is increased during sleep.

Over 90 per cent of the radio fans in Milwaukee use loud speakers.

Only one man in 4,000 becomes "eminent," Sir Francis Galton found.

There were 83 deaths from aviation accidents in the United States in 1925.

The big sequoia trees of California were a well developed genus in the distant age of the dinosaurs.

Between 12 and 15 million radio sets are in use in the world, according to a recent survey.

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## Experiments Favor Einstein

Midnight balloon ascensions a mile and a half high made recently in Belgium may prove to be strong evidence in favor of Einstein's theory of relativity, and contrary to the results obtained by Dr. Dayton C. Miller, of the Case School of Applied Science at Cleveland, working at the Mt. Wilson Observatory in California, which were supposed by some authorities to be fatal to the German's theory. These balloon experiments, just published, were made by Prof. A. Piccard and Dr. E. Stahel, of the University of Brussels.

They were a repetition of the Michelson-Morley experiment, named after the physicists who first performed it many years ago. This was intended to show whether or not the earth, on account of its motion, was drifting through the ether, which was supposed to permeate all space, and to be the medium in which light waves vibrate. When first performed, an almost negligible result was obtained. It was partly in an effort to explain this unexpected result that the theory of relativity was formulated. When repeated last year by Dr. Dayton C. Miller, of the Case School of Applied Science, Cleveland, working at the Mt. Wilson Observatory in California, a mile above sea level, an apparent effect was found. While this was not as great as had been originally expected, Dr. Miller said that it could be explained by a motion of the sun, and the earth with it, towards the constellation of the Dragon, at a speed of over a hundred miles a second. This was antagonistic to the relativity theory.

In the new work, the Michelson-Morley experiment was repeated at sea level and from a balloon. A somewhat modified form of apparatus was used, in which the records were made on a photographic film, instead of by the eye, as in Miller's apparatus. As it is necessary to turn the apparatus while the experiment is in progress, so that it successively points in different directions, this was accomplished by providing the balloon with two small electrically operated propellers, turning the entire balloon about two or three times a minute. The illumination of the apparatus, which must be furnished by light of a single color, was obtained from the blue radiation of a mercury vapor lamp.

From measurements of the photographic records, it was found that there was an apparent ether drift of

about four and a third miles a second. However, as the thermostat controls of the apparatus, intended to keep it at a constant temperature were designed to work with the thermometer below freezing, and since unexpectedly higher temperatures were found the night of the ascent, the results may be in error by an amount as great as the value found. However, it was stated, they show that the value of the ether drift does not increase, the higher above the earth the observations are made, which was the chief point of antagonism with the relativity theory.

What is said to be another new point in favor of the validity of Einstein's theory of relativity is contained in a series of experiments recently completed by Dr. Roy J. Kennedy, of the California Institute of Technology, at Pasadena, and which have just been reported to the National Academy of Sciences.

Dr. Kennedy has also repeated the Michelson-Morley experiment with an improved form of apparatus, in which the beam of light, which is divided into two parts and then recombined, causing alternate light and dark "interference" bands, travels only about 13 feet, instead of more than 200 feet as in Miller's apparatus. The effect sought for is measured by means of a shift in these interference bands as the apparatus is pointed in different directions. With the instrument used by Dr. Miller, says Dr. Kennedy, a difference in pressure of a twenty-five thousandth of a pound per square inch in the air through which the two parts of the divided beam pass, would produce an effect as great as that observed. A temperature difference of a five-hundredth of a degree Fahrenheit would produce the same effect, he stated.

As Dr. Kennedy's light path was so much shorter, there was much less chance of such error, and the entire apparatus was small enough to be completely enclosed in a sealed metal case containing helium gas, which was at atmospheric pressure. This prevented circulation of the air, and any difference in pressure or temperature in different parts of the apparatus. By means of an improvement in the way of observing the interference bands, the instrument is as sensitive as Dr. Miller's despite the shorter light path. However, though "a shift as small as one-fourth that corresponding to Miller's would be perceived," said Dr. Kennedy, "the result was perfectly definite. There was no sign of a shift depending on the orientation. Because an ether drift might conceivably depend on altitude,

the experiment was repeated at the Mt. Wilson Observatory, in the 100-inch telescope building. Here again the effect was null."

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## GENERAL SCIENCE

## The Importance of Research

Extract from a speech delivered by Secretary of Commerce Herbert Hoover at a banquet to celebrate the 25th anniversary of the founding of the U. S. Bureau of Standards, December 4, 1926.

I am impressed with the fact that we are a people of 110,000,000 on a continent where we have already developed the large proportion of our national resources, a population growing at a rate that we must face in the next fifty years, doubling up to perhaps two hundred million people. We must face the solemn economic fact that unless we develop through science the greater utility of our resources, expand by discovery their usefulness, we can not maintain the standards of living of that vast increment of population to those standards that we now enjoy.

Dr. Malthus a century ago brought forth a theory, with which you are all familiar, that an increase of population would be met with pressure on subsistence which would defeat its own purpose. The Malthusian doctrine has not proved true. It has not proved true due solely to the development of science and the discovery of its applications, and today we are just in that same race of population and science. It is only through the support of agencies of this character, and hundreds of other institutions engaged in scientific research, that we may expect with confidence that as our population grows we can still add this increment of comfort and luxury which we have enjoyed in the last century.

But science has more to it. It stands for far greater things than purely material benefits. Research, development and engagement in science is an engagement in the elaboration of truth, the discovery of truth. It is a process of improvement in the veracity of man and precision of thought, and those indeed are spiritual benefits for from the truth, the development and science of truth in our people, must come an appreciation of those things that lie in the realms of the imponderable and that lie out of the range of the material in life.

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A battery of three-inch anti-aircraft guns can fire 60 shells a minute.

Goats, cattle, and horses are known to eat poison ivy without ill effects.

# How to Use Index Feature of News-Letter

In order to aid in catching the items that concern you and to facilitate clipping and filing, a key word in small capitals has been printed on the right of the line above each article. The key words used fit into any system of classification, whether it be a straight alphabetical file, a system of your own devising, the Library of Congress classification or the Dewey system.

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BF Psychology.  
G Geography, voyages, travel.  
GA Mathematical and astronomical geography.  
GB Physical geography.  
GC Oceanology and oceanography.  
GF Anthropogeography.  
GN Anthropology. Somatology. Ethnology. Ethnography. Prehistoric archaeology.  
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HC Economic history and conditions. National production.  
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QA Mathematics.  
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QC Physics.  
QD Chemistry.  
QE Geology.  
QH Natural history.  
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SD Forestry.  
SF Animal culture. Veterinary medicine.  
SH Fish culture and fisheries.

SK	Hunting. Game protection.	530	Physics
T	Technology. General.	540	Chemistry
TA	Engineering—General.	550	Geology
TC	Hydraulic engineering.	560	Paleontology
TD	Sanitary and municipal engineering.	570	Biology
TE	Roads and pavements.	580	Botany
TF	Railroads.	590	Zoology
TG	Bridges and roofs.	600	USEFUL ARTS—
TH	Building construction.	610	Medicine
TJ	Mechanical engineering.	620	Engineering
TK	Electrical engineering and industries.	630	Agriculture
TL	Motor vehicles. Cycles. Aeronautics.	640	Domestic economy
TN	Mineral industries. Mining and Metallurgy.	650	Communication. Commerce
TP	Chemical technology.	660	Chemical technology
TR	Photography.	670	Manufactures
TS	Manufactures.	680	Mechanic trades
TT	Trade.	690	Building
TX	Domestic science.	700	FINE ARTS—
U	Military science. General.	710	Landscape gardening
V	Naval science. General.	720	Architecture
		730	Sculpture
		740	Drawing. Decoration. Design
		750	Painting
		760	Engraving
		770	Photography
		780	Music
		790	Amusements
		800	LITERATURE—
		810	American
		820	English
		830	German
		840	French
		850	Italian
		860	Spanish
		870	Latin
		880	Greek
		890	Minor languages
		900	HISTORY—
		910	Geography and travels
		920	Biography
		930	Ancient history
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130	Mind and body
140	Philosophical systems
150	Mental faculties. Psychology
160	Logic
170	Ethics
180	Ancient philosophers
190	Modern philosophers
200	RELIGION—
210	Natural theology
220	Bible
230	Doctrinal. Dogmatics. Theology
240	Devotional. Practical
250	Homiletic. Pastoral. Parochial
260	Church. Institutions. Work
270	Religious history
280	Christian churches and sects
290	Ethnic. Non-Christian
300	SOCIOLOGY—
310	Statistics
320	Political science
330	Political economy
340	Law
350	Administration
360	Associations. Institutions
370	Education
380	Commerce. Communication
390	Customs. Costumes. Folklore
400	PHILOLOGY—
410	Comparative
420	English
430	German
440	French
450	Italian
460	Spanish
470	Latin
480	Greek
490	Minor languages
500	NATURAL SCIENCE—
510	Mathematics
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## Intelligence of Geniuses

(Continued from Page 178)

the possession at the age of 8 of general ability that would register successes in intelligence tests at the 14- or 16-year level."

Throughout the account of Mill's boyhood he is always seen, not learning and repeating parrot lessons, but thinking and challenging the ideas of other thinkers.

Now, in figuring the "mental age" of a growing child, psychologists figure that the intelligence rating of the average child of any physical age would be 100. An individual who is superior in intelligence for his physical age may be rated 110 or so on indefinitely upward. On the basis of his achievements up to 16 years, young Mill gets an Intelligence Quotient of 190.

In later life, Mill became prominent as a thinker and writer, though not one of the leading lights of history. Dr. J. McKeen Cattell has ranked 1,000 of the world's most eminent men according to the space that is given to each one in biographical dictionaries. By this test, Mill ranks only 103d in adult eminence out of the group of 300 famous characters who were tested in childhood intelligence.

The next three brightest boys, Goethe, Grotius, and Leibnitz, all received Intelligence Quotients of 185, or 85 points above average mentality. Considering Grotius' biography, Dr. Cox says that at eight his ability was at least that of a youth of 16; at 16 it was that of a mature scholar. And combined with a rare intellect was its complement, a noble character.

"Grotius, Leibnitz, Goethe," she adds, "three universal geniuses, the evidence of whose overpowering intellect appeared and was recognized in earliest childhood as it was later



JOHN STUART MILL, who goes to the head of the class for precocious boys. At six years, John wrote a history of Rome and his conversation bristled with double-jointed words.

in their youth, are doubtless among the greatest minds with whom this study is concerned. A minimum childhood Intelligence Quotient for these cannot be less than 180. A maximum is probably close to the maximum for the human race."

These three, like Mill, grew up to make outstanding contributions to the world's thought, though critics might not agree to place them at the very head of their contemporaries.

Mme. de Staél, who stands highest in youthful mentality among the women of the group, is given an intelligence rating of 155. Mme. de Staél is outranked in intelligence by only 27 of the others, according to historical records of childhood. In adult eminence she ranks 94th among the 300 geniuses, by the biography standard. The quality of her brilliance as a woman may be estimated from Napoleon's remark that "She inspired thought in people who had never taken it into their heads to think or who had forgotten how."

Is there, then, any connection between a certain degree of childhood superiority and a certain amount of achievement in later life?

Dr. Cox says that if sufficient evidence was available a number of the famous characters would be entitled to childhood intelligence ratings of over 200. Such men as Michelangelo, Newton, Pascal, Comte, Grotius, Sarpi, Voltaire, Wolsey probably belong this high.

"Occasionally in our day," she says, "a case is recorded that ranks at this high level. Shall we expect in such an instance a Comte, a Grotius, a Newton, or a Michelangelo? We are

probably warranted in expecting superior adult achievement wherever in childhood the Intelligence Quotient is above 150. But we may not be warranted in expecting a world genius even if the 200 IQ level is reached; for there are other factors involved in achieving greatness besides an essential degree of intellectual capacity."

Performances of individuals who have taken intelligence tests were the standard of comparison for the intelligence ratings of the famous children, and these tests cannot measure spontaneity of intellectual activity, it is pointed out. And there is the further possibility that the intelligence tests do not sufficiently reveal a difference between high ability of a talented individual and the unique ability of the extraordinary genius.

Why all equally intelligent children do not become equally great men and women is attributed partly at least to differences in personality.

"Youths who achieve eminence are characterized not only by high intellectual traits, but also by persistence of motive and effort, confidence in their abilities, and great strength or force of character," Dr. Cox declares. "The superior youths considered in the present study pursued high ideals, developed significant interests, and created new expressions of scientific and philosophical thought before they had reached the age of manhood.

"Schelling had outlined his philosophy at 20. Hume had defined his views before he was 25, Milton at 21 wrote an ode pronounced by an eminent critic to be perhaps the most beautiful in the English language. Peel at 24 was Chief Secretary for Ireland, Raphael at 21 painted the Granduca Madonna, Beethoven at 18 was appointed Chamber Musician to

(Just turn the page)

Intelligence ratings of the brightest boys in Dr. Cox's class of historic geniuses, and their rank in order of fame when they grew up:

Ten Brightest Boys	How they grew up
Mill . . . . .	190
Goethe . . . . .	185
Grotius . . . . .	185
Leibnitz . . . . .	185
Pascal . . . . .	180
Macaulay . . . . .	180
Bentham . . . . .	180
Schelling . . . . .	175
Haller . . . . .	175
Coleridge . . . . .	175
	157

The ten greatest men out of the 300 geniuses, judged by the length of their biographies, compared with their intelligence ratings as children:

Ten Greatest Men	Intelligence as Boys
1. Napoleon . . . . .	135
2. Voltaire . . . . .	170
3. Francis Bacon . . . . .	145
4. Goethe . . . . .	185
5. Luther . . . . .	115
6. Burke . . . . .	135
7. Newton . . . . .	130
8. Milton . . . . .	145
9. Pitt (the younger) . . . . .	160
10. Washington . . . . .	125

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## SCIENCE SERVICE

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### Intelligence of Geniuses

(Continued from Page 183)

his princely ruler, Newton had unfolded his doctrine of light and colors before he was 20, Bacon wrote his *Temporis Partus Maximus* before the age of 20. Montesquieu had sketched his *Spirit of Laws* at an equally early age, and Jenner, when he was still younger, contemplated the possibility of removing from among the list of human diseases one of the most deadly scourges of the race. Achievements like these are not the accidents of a day. They are the natural outgrowth in individuals of superior general powers of persistent interest and great zeal combined with special talents."

Persistence is a trait which stands out again and again in the fragments of biography that have been preserved about these young geniuses. Whether or not they astounded their relatives with profound remarks they almost all displayed a tenacity of interest. Some seem to have been intensely interested in a number of things. But in the majority of cases the child's attention seems to have become centered on one line. The better he became acquainted with the subject the more it attracted him.

This is most marked among the great musicians. Many of the scientists, too, showed an early curiosity about natural phenomena and began making collections and experimenting at an early age. Napoleon in another, quite different, field showed the same consistency of interest. As a small boy he preferred tin soldiers to other toys. A little later, he organized and led the village boys against the shepherd boys. At 14 he mastered the strategy of snow fights, and at the military college in Paris his spare hours were spent studying tactics and planning battles.

How important persistency is to achievement, may be seen from Dr. Cox's conclusion that "high but not the highest intelligence, combined with the greatest degree of persistency, will achieve greater eminence than the highest degree of intelligence with somewhat less persistency."

In addition to mental gifts and strong character traits, Dr. Cox finds one other significant factor which contributes largely to the development of genius. This factor is good heredity and superior advantages in early environment. It is true that many able and gifted parents have mediocre children, and equally true that a good many geniuses have risen from miserable surroundings. But among the geniuses studied, over three-fourths

belonged to the upper, educated classes. And in addition, the average opportunity for superior education and for inspiring social contacts was found to be unusually high.

The significance of the entire investigation, Dr. Cox believes, is derived from the evidence it presents that the genius who achieves the highest eminence is also the gifted individual whom intelligence tests may discover in childhood.

To what extent the youthful careers of the great geniuses of the past can be used in guiding the careers of gifted children of today has not yet been worked out. Children who are slow and mentally deficient are regularly given special attention in special schools, in our modern educational system. But so little has been known about the traits and education of gifted children that the development of their talents has always been largely a matter of chance. Now and again, parents and teachers have experimented radically with such children, sometimes with great success, occasionally with tragic results.

The investigation into the past made by Dr. Cox, and the investigation of 1,000 gifted children of the present by Dr. Terman, are the first steps toward an extensive survey of the question, which since Plato's time has been vaguely and helplessly recognized as "important".

Science News-Letter, December 18, 1926

In its earliest stages, tuberculosis can be cured in practically 100 per cent. of cases, specialists say.

A recent investigation shows that the average income of doctors in New York city is about \$2,000 a year.

A new electric lamp which gives off the same light as daylight is being used by artists for night work.

Traffic lanes in London are being marked by holes drilled in the paving and filled with porcelain buttons.

The Canadian Government has approved the scheme to harness the St. Lawrence at Morrisburg, Ontario.

A small folding airplane, which can be carried in a tank on a submarine, has been designed for the U. S. Navy.

The eruption of Vesuvius in 79 A. D. was preceded by a number of earthquakes beginning 16 years before.

Ancient and medieval philosophers believed that plant and animal life might arise spontaneously without parentage.

**GEOGRAPHY****China's Resources Ample**

China, the land of famines, could double her food supply by opening up virgin soil and introducing scientific farming.

Packing plants comparable to those of Chicago located somewhere north of Peking are foreseen by Dr. Shih Tsin Tung, economist, who has recently made a report of the resources of his country to the *Scientific Monthly*. Some of the world's best ranches exist in regions in China that have received but little development, declares Dr. Shih.

The future expansion of the celestial republic will probably not, however, put a large surplus of food on the world market. With the slow reclamation of the huge country from the primitive conditions of the present there will be a gradual rise in the standard of living according to Dr. Shih. Consequently the China of the future will consume her own products and possibly import some. For these imports, Dr. Shih explained, she will pay with the income from natural resources of minerals, coal and water power that are at present comparatively untouched.

Science News-Letter, December 18, 1926

**HEALTH****Accidents in Home**

Around 17,000 deaths and several millions of injuries occur every year in American homes.

Accidents that endanger life and limb in industry and on the public highways are gradually being reduced by safety engineering and educational propaganda but domestic accidents have remained a problem as yet un-attacked.

To repair this gap in protection to human life, Louis I. Dublin, statistician to the Metropolitan Life Insurance Company, has recommended to the National Safety Council that it appoint a committee to investigate facts about the injuries and fatalities that occur in homes so that a constructive program can be arranged on this basis.

More than a third of the deaths are of children under fifteen.

Science News-Letter, December 18, 1926

**The Mind Healer of Deal**

There was a mind-healer of Deal  
Who said: although pain is not real,

When I sit on a pin

And it punctures my skin

I dislike what I fancy I feel.

—Anonymous.

Science News-Letter, December 18, 1926

**ENTOMOLOGY****New Ant Poison**

The apartment house dweller who finds himself dispossessed of his costly cubicular domicile by persistent clans of ants should take heart. A poisonous potion of particular deadliness has been concocted at the U. S. Department of Agriculture which spells the end of even the little red kind that feed on arsenic syrup without turning an antenna.

Compounds of thallium, one of the rarer elements, are used in the new "dope" which has been found to be a vicious death dealer to several resistant species of the minute pests, according to C. H. Popeno, expert in the U. S. Bureau of Entomology. Though thallium is too expensive to be used on a large scale as an insecticide its potential value as an efficient bug killer in apartments and houses is of considerable importance. Householders will await with interest the results of further tests on other insects that are being carried out in the Bureau of Entomology.

Science News-Letter, December 18, 1926

**ENGINEERING****High Pressure Locomotives**

The use of high steam pressure in reciprocating locomotives brings about greater tractive force and also a decrease in steam consumption and hence a decrease in coal consumption, Edward C. Schmidt and John M. Snodgrass, University of Illinois professors, told the American Society of Mechanical Engineers at its recent meeting. The use of high steam-pressure opens the avenue to highest operating efficiency and economy.

Experiments have been satisfactorily made along this line and a number of railroads both in this country and abroad have appreciably increased the steam pressure in reciprocating locomotives. So far the increase of steam pressure above 300 pounds is extremely rare. Only one locomotive in the service of any American railroad is carrying a boiler pressure higher than this. The reason for this hesitancy to increase the pressure beyond this mark is the necessity of radical changes in boiler designs to cope with the high temperature of high pressure steam. The Delaware and Hudson, the one railroad to use a boiler pressure of over 300 pounds, used a boiler vastly different from the customary design. The experiment was so successful, however, that the railroad is having another locomotive built which will carry a boiler pressure of 400 pounds.

The reason for this trend toward high pressure, it was stated, lies in the fact that while the total heat to be imparted to a pound of water remains practically the same at all pressures, the heat of vaporization, which is never available as mechanical energy, steadily decreases as the pressure increases. This means that as the pressure rises, a steadily increasing percentage of the heat is available as useful work.

Science News-Letter, December 18, 1926

**MEDICINE****No Plagues Last Year**

None of the major quarantinable diseases like plague, cholera or yellow fever gained access to our shores this last year, according to the annual report, just issued, of Surgeon General Hugh S. Cumming of the U. S. Public Health Service.

The economic necessity of keeping out epidemics has bitten into the consciousness of all classes, with the result that increased efficiency in quarantine regulations has been accomplished with a minimum of delay and expense to the shipping and traveling public. Constant vigilance at all ports has achieved a freedom from imported diseases in spite of the fact that health conditions in the world at large have been threatening, declares Dr. Cumming.

Typhoid fever unhappily has taken a big upward jump over the great improvement of the last few years, the figures of the report show. Over 9,000 more cases occurred in the United States in 1925 than in 1924. The increase is biggest in the small towns and rural population where milk, water and food supplies are not under such careful control as in large cities. Cities of over 100,000 inhabitants showed a very slight increase over the 1924 figures.

Gourmets with a weakness for oysters and clams may resume their favorite delicacy with renewed composure. Dr. Cumming reports that measures on which the Bureau of Fisheries and the Bureau of Chemistry have collaborated are now in force to safeguard shellfish from contamination in the states where they are produced. It is expected by health authorities that these regulations will have enhanced the ultimate purity of the oyster as it appears on the table so that its consumption can be approached with less fear and trembling.

Science News-Letter, December 18, 1926

## The Problem of Translation—

¶Science, probing the unknown universe, writes its findings in cryptic language. A stellar galaxy shining faintly in the heavens hides its splendor and its immensity in numbers and formulæ; a minute germ has thrust upon it a long Latin name. With the aid of such scientific shorthand and such technicalities, science pushes on to new discoveries and new heights.

¶Yet the facts and the methods of science must penetrate and permeate the whole fabric of civilization if the world is to become an increasingly better place to live in. The man in the street, the child in the school, the merchant in the counting house, the judge on the bench, the priest in the temple, all of those who make the world, must know, appreciate, understand and cherish the spirit of research and the power of thought.

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## Scientific Wonders Exhibited

Living hearts in embryo chicks, pumping blood through the unhatched birds' circulatory systems, delicate needles than can pierce and carve a microscopic plant or animal cell under the lens, fossil remains of the biggest animals and the biggest plants that the world ever knew, were among the scientific wonders inspected by a brilliant gathering of scientists at the annual reception of the Carnegie Institution of Washington, which preceded its yearly public exhibit of its work. According to its custom, the Carnegie Institution kept open house recently and invited the general public to visit its headquarters and view the exhibits under the guidance of its staff members.

One of the exhibits that attracted much attention was an embryo of a living chick, into whose blood stream a small amount of India ink had been injected. The black fluid made it easy to trace the course of the circulation. A companion exhibit had had its arteries and veins rendered transparent by means of wintergreen oil, so that the whole delicate web-work of blood vessels could be seen.

In the section for plant physiology, an artificial cell was shown, constructed on the pattern of the living units of plant and animal bodies. Made out of lifeless materials, it nevertheless closely parallels the activities of the living cells in many respects. Here was shown also a method for measuring the water-delivering capacity of the soil by means of a sort of artificial root model made of porcelain, which sucks up water greedily, and by its increase in weight shows how much the soil can deliver to a given surface in an hour.

Results of the studies on extinct fossil whales, showing evidences of the seaward evolution of these once land-dwelling giant mammals, were shown, together with fossils of ancient trees like the "big trees" of California, which once occupied a large part of the American continent. As companions to these monuments of animal and vegetable antiquity, there were shown photographs of this year's great finds in the human antiquities of Central America, where the Carnegie Institution's expeditions have unearthed further splendors in the great Maya cities of Chichen Itza and Coba.

Diatoms, "the grass of the sea," were shown under a battery of microscopes. These plants, though minute in size, are of fascinating shapes and

patterns, and because of their abundance are the principal basic food of all fishes and other forms of marine animal life. The "micromanipulator" also attracted much attention. It is an instrument which enables an observer to perform delicate surgical operations on living cells while he watches his work through a microscope.

Science News-Letter, December 18, 1926

## BOTANY—AGRICULTURE

### Kingly Plant Importation

King George III, the royal bogeyman of early American history, may not have "known his oats" in the matter of Colonial politics, but he was no fool when it came to knowing other plants and securing the best scientific and economic results from them, according to the testimony of Dr. A. W. Hill, director of the Royal Botanic Gardens at Kew, England. The Kew establishment, now the largest botanic gardens in the world, was initiated by the mother of George III, who set aside two adjoining palace gardens for this purpose; but it was George himself who through his friendship for the early English botanist, Sir Joseph Banks, really gave shape and purpose to the donation and started the immensely profitable practice of making Kew the headquarters for the transplantation of new and valuable tropical species from one British colony to another.

Since that day, Dr. Hill states, practically every important transplantation of plant industry in the British Empire has passed through Kew. Among these have been the establishment of the Para rubber industry in Malaya and the transfer of the cinchona quinine tree from South America to India and the East Indies.

But King George and the botanists of Kew must not be given credit for starting the business of plant introduction, though they were the first to make a science of it, Dr. Hill says. In early post-Columbian days the Spanish galleons plying between Mexico and the Philippines frequently carried valuable plant species from the New World to the Old, and vice versa. But before the Spaniards there must have been other unrecorded voyagers among the brown-skinned peoples of the Pacific, for there are many plants, notably the coconut and banana, whose wide distribution cannot be explained on any basis other than human carriage.

Science News-Letter, December 18, 1926

## NATURE RAMBLINGS

By FRANK THONE



55

### A Splendid Crown

Of all the horned animals of the world, none bears so proud and splendid a crown as the American elk. The antlers of the various species of deer are very well in their way, but they are all of them relatively small; those of the moose, though more massive, lack the grace and symmetry of the elk's. For a combination of masculine strength and a beauty that though wild is not savage, the head of the elk remains supreme.

The astonishing thing about all antlered animals is that they grow this great spread of horn every year. In the early spring the antlers begin to sprout, and they grow apace through the summer, covered by a coat of short-haired skin known to woodsmen as the "velvet," which shelters the numerous blood vessels and nerves that take care of the nourishment of the growing horn. When the horns are mature this "velvet" dies and peels off in long strips. To get rid of it the bucks rub their heads through branches and bushes; this is known as "horsing the brush."

With the maturing of the horns the annual urge to seek mates arises strongly, and desperate fights, or rather head-on wrestling matches ensue between the males, for the possession of the herd of cows; for elk are highly polygamous. After the rutting season is over the horns are of no further use, and during the winter they come loose and drop off.

While the number of points on an elk's antlers increases each year up to seven or eight, they do not furnish an accurate means of determining the age of the animal. Sometimes two points will be added the same year, sometimes the new antlers have the same number as the old ones just shed.

It is to be hoped that the fashion of wearing elk teeth as lodge emblems will soon pass. Each male elk has but two teeth that will serve for this purpose, and in too many instances conscienceless hunters, poaching on Federal or State preserves, kill these beautiful animals for no other purpose than to secure two bits of ivory.

Science News-Letter, December 18, 1926

# Science Service Books

In cooperation with leading book publishers, Science Service has taken part in editing the following books on science:

**CHATS ON SCIENCE.** By Edwin E. Slosson. New York: The Century Company. 1924. \$2.00.

**SCIENCE REMAKING THE WORLD.** Edited by Otis W. Caldwell and Edwin E. Slosson. New York: Doubleday, Page & Co. 1923. \$2.50 and \$1.00.

**KEEPING UP WITH SCIENCE.** Edited by Edwin E. Slosson. New York: Harcourt, Brace & Co. 1924. \$2.50.

**WHY THE WEATHER?** By C. F. Brooks. New York: Harcourt, Brace & Company. 1924. \$2.00.

**SOIL AND CIVILIZATION.** By Milton Whitney. Library of Modern Sciences. New York: D. Van Nostrand Co. 1925. \$3.00.

**ANIMALS OF LAND AND SEA.** By Austin Clark. Library of Modern Sciences. New York: D. Van Nostrand Co. 1925. \$3.00.

**THE EARTH AND THE STARS.** By C. G. Abbot. Library of Modern Sciences. New York: D. Van Nostrand Co. 1925. \$3.00.

**MYSTERY OF MIND.** By Leonard Troland. Library of Modern Sciences. New York: D. Van Nostrand Co. 1926. \$3.00.

**FOUNDATIONS OF THE UNIVERSE.** By M. Luckiesh. Library of Modern Sciences. New York: D. Van Nostrand Co. 1925. \$3.00.

**CHEMISTRY IN MODERN LIFE.** By Svante Arrhenius, translated and revised by C. S. Leonard. Library of Modern Sciences. New York: D. Van Nostrand Co. 1925. \$3.00.

**CHEMISTRY IN THE WORLD'S WORK.** By H. E. Howe. Library of Modern Sciences. New York: D. Van Nostrand Co. 1926. \$3.00.

**STORIES IN STONE.** By Willis T. Lee. Library of Modern Sciences. New York: D. Van Nostrand Co. 1925. \$3.00.

**EVERYDAY MYSTERIES.** By Charles Greeley Abbot. Young People's Shelf of Science. Edited by E. E. Slosson. New York: The Macmillan Co. 1923. \$2.00.

**DWELLERS OF THE SEA AND SHORE.** By William Crowder. Young People's Shelf of Science. Edited by E. E. Slosson. New York: The Macmillan Co. 1923. \$2.25.

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## First Glances at New Books

EVAPORATION—Alfred L. Webre and Clark S. Robinson—*Chemical Catalog Co.* (\$8.50). One of the "Modern Library of Chemical Engineering," a new series invaluable to all concerned in the chemical industries and to teachers who want to keep up with progress in industrial fields. It gives, on the one hand, the fundamental principles and mathematical data of the processes in full, and, on the other hand, their application to factories for beet sugar, cane sugar, paper making and the like.

Science News-Letter, December 18, 1926

THE CHEMISTRY OF WOOD—L. F. Hawley and Louis E. Wise—*Chemical Catalog Co.* (\$6). Cellulose has recently become a raw material in many chemical industries and it is very difficult to work up its complex chemistry from the diffused and confusing literature. This volume gives a comprehensive and well considered compendium of our present knowledge together with full references to the original papers. It explains how this fundamental substance will produce paper, rayon, sugars, alcohols, acids and plastics.

Science News-Letter, December 18, 1926

JUST TEN MINUTES. A Health Story—Eleanor Glendower Griffith—Illustrated by Jessie Gillespie. *Smith Hammond*. A fairy story for young children intended to point the moral of early to bed, milk drinking, and plenty of water inside and out.

Science News-Letter, December 18, 1926

DARWIN—Gamaliel Bradford—*Houghton, Mifflin*. (\$3.50). Charles Darwin's personality observed from a number of angles in a well written, intimate biographical study.

Science News-Letter, December 18, 1926

THE ROMANCE OF OUR WONDERFUL WORLD—P. J. Risdon—*Lippincott*. The evolution of the earth from the period of geologic chaos down to the present time described in a manner calculated to appeal to non-scientific readers.

Science News-Letter, December 18, 1926

A STUDY OF THE OCEANS—James Johnstone—*Longmans, Green* (\$3.75). A complete and useful account of the oceans, including early and recent explorations, the knowledge of the ancients, geology of the oceans, and their relation to civilization.

Science News-Letter, December 18, 1926

## GEOLOGY Earthquakes and Automobiles

Quotation from *OUR MOBILE EARTH*. By Reginald A. Daly. New York: Charles Scribner's Sons.

Mallet, the father of the science of earthquakes, estimated the lives lost through earthquakes during 4,000 years to have numbered 13,000,000. Nevertheless, the fame of seismic disasters is not due to the total damage occasioned by earthquakes. In part men are impressed specially because the human tragedies are concentrated in space and time. Of at least equal influence is the periodically renewed, nerve-racking discovery that the solid earth, the very symbol of stability and reliability, has treacherously failed. The horror of the earthquake is largely a matter of the imagination, often quickened to the breaking point of sanity. Hence, for more than one reason, man tends to exaggerate the relative damage done by earthquakes to himself and his works. As a corrective one does well to view that damage in relation to other scourges. We glance at the newest pestilence, the automobile. Mallet's estimated rate of killing for the whole earth during forty centuries is only one-sixth of the rate at which the automobile is destroying lives in the United States alone. When, in addition, we think of the infinite load of fear which the automobile has brought upon the responsible members of the American public, we see at once that there is no particular reason why we should become hysterical over earthquakes.

It is a question whether this chronic fear of the automobile, this imponderable damage to the happiness and health of the inhabitants of our country, is not a greater loss to our civilization than all the killings and maimings on our highways. Similarly, no statistician can declare the packed misery of the fateful minutes of an earthquake, nor the prolonged agony of personal and social reconstruction. He must fail to tell the story, just as art must fail. No Aeschylus or Dante can reach the heart of such a matter. It is as unimaginable as the drowning of a million men, women and children in a single flood of the Yellow River; as ungraspable as the Great War. However, the little part of the sorrow which the outside world can imagine, prompts almost unexampled sympathy, compassion, and remedial measures.

Men need not be content with remedial measures. Though seis-

mology, the science of earthquakes, is very young, we already know much concerning the nature of these movements and concerning the regions where they are important. Knowledge of their nature will help engineers and other men of business to build more stable houses, towns, railways, water-supply systems, and docks. Knowledge of distribution, especially with respect to the kinds of rock formations in the ground, will guide city fathers and statesmen in planning town sites, port facilities, and railway lines. The problem of forecasting earthquakes is intrinsically difficult, but some suggestions are in hand for at least a partial solution.

Not only has this new science practical bearing on human welfare; seismology has already thrown a flood of light on the nature of the earth's deep interior. That mysterious, hidden part of the planetary body dominates many of the processes that have made the surface of the globe what it is. Earthquakes traveling through the interior of the globe are like so many messengers sent out to explore a new land. The messages are constantly coming and seismologists are fast learning to read them.

Science News-Letter, December 18, 1926

## GENERAL SCIENCE

### A Newton of the Soul

By SULLY-PRUDHOMME

To Newton, when an apple fell,  
The laws of Matter were revealed:  
Shall future sage arise to tell  
What in the Soul of Man is sealed?

And as there is in ether blue  
A point from which the worlds suspend,  
So souls of men—if we but knew—  
Are drawn to God, their Source and  
End.

And as the flaming spheres that turn  
With rhythmic greetings through the  
skies;  
The Soul Love's harmonies may learn,  
And toward its Center, glad arise.

But to the stars is not allowed  
Nor gentle touch, nor fond caress.  
Tho' human hearts, their troth avowed,  
May loving hands with ardor press.

Who'll sound the Universe of Soul?  
Reveal the laws of Life and Thought?  
Come, Newton of a loftier goal,  
Unbar those heavens with secrets  
fraught!

—Translated for Science Service by  
Flora Preston Hogbin.

Science News-Letter, December 18, 1926

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## Anniversaries of Science

**December 25, 1642.**—Birth of (Sir) Isaac Newton.

Regard the matter as we may, among moderns at least the first place by a sort of common consent of mankind, without regard to nationality or calling, is awarded to Sir Isaac Newton. Without doubt, if one were asked to point to a single volume through all the ranges of literature, whether ancient or modern, which exhibits in the highest degree the powers of the human mind, one would fix without further thought upon Newton's *Principia*. It is amazing to reflect that it was as sheerly a product of chance as any event to which one might point.

—Snyder: *The World Machine*.

**December 25, 1757.**—Halley's comet returned, according to Halley's prediction. He had identified the comet, which had previously been recorded by Apian in 1531 and Kepler in 1607 as the same which he observed in 1682.

One of the most remarkable periodic comets with which we are acquainted is that known to astronomers as Halley's. Having perceived that the elements of the comet of 1682 were nearly the same as those of two comets which had respectively appeared in 1531 and 1607, Edmund Halley concluded that all the three orbits belonged to the same comet, of which the periodic time was about 76 years. After a rough estimate of the perturbations it must sustain from the attraction of the planets, he predicted its return for 1757—a bold prediction at that time, but justified by the event, for the comet again made its appearance as was expected.

—Simon Newcomb: *Comet* in Enc. Brit.

**December 25, 1497.**—Vasco da Gama, rounding Africa on the way to India, reached and named Natal.

The Cape once rounded, the attaining of India was found an easy matter, as Cavilao had written; and Vasco da Gama secured immortality upon terms as easy, perhaps, as any ever granted, either before or since. Guided by the pilot who had accompanied Bartholomew Diaz, he reached and named Natal on Christmas Day, 1497.

—Guillemand: *Life of Ferdinand Magellan*.

**December 27, 1831.**—Charles Darwin started on the 5-year cruise of the "Beagle" on which his observations of animals in all parts of the globe established in his mind the basis of his future views on evolution.

When on board H. M. S. Beagle, as naturalist, I was much struck with certain facts in the distribution of the organic beings inhabiting South America, and in the geological relations of the present to the past inhabitants of that continent. These facts, as will be seen in the latter chapters of this volume, seemed to throw some light on the origin of species—that mystery of mysteries, as it has been called by one of our greatest philosophers. On my return home, it occurred to me, in 1837, that some-

thing might perhaps be made out on this question by patiently accumulating and reflecting on all sorts of facts which could possibly have any bearing on it.

—Darwin: *Origin of Species*.

Science News-Letter, December 18, 1926

## ZOOLOGY

### Mountain Lion A Coward

The mountain lion is perhaps the least courageous of the larger wild animals and rarely shows fight unless wounded, says M. E. Musgrave of the U. S. Biological Survey in a report to the *Journal of Mammalogy*.

When sighted on the ground the mountain lion's first impulse is to escape. It makes for a tree where it stays until a hunter approaches, then it jumps to the ground and runs for another tree. After being run out of two or three trees it is about worn out, being very short winded, and refuses to leave. Hanging on to its perch on a limb with all claws dug into the bark it refuses to jump even though punched at with a stick. The author says that he has often climbed out on the branch of a tree and taken snapshots of a lion while sitting within six feet of it. Apart from hissing and growling it showed no signs of fight.

The mountain lion can run with express train speed for about 100 yards, and then it is winded and must take to a tree. Mountain lions have been known to spring from the ground and land twelve or fifteen feet above in a tree. They have also been known to jump to the ground from a height of fifty or sixty feet and land on their feet unhurt.

The mother lion will even desert her young when dogs draw near, though she rarely travels any distance from the cubs. After her first dash for safety she takes to a nearby tree and if chased out of that circles about in the vicinity, but does not approach the lair where the kittens are hidden.

This cowardice seems hard to reconcile in view of the fact that the average mountain lion weighs about 150 pounds, and is a very powerful animal. Horses weighing eight or nine hundred pounds have been killed and dragged thirty feet or more into the bushes. Deer and big calves have been carried off from the scene of the kill without any evidence of dragging.

Science News-Letter, December 18, 1926

The largest searchlight in the world, with two billion candle power, is so strong that a man could read by its light 40 miles away.

## Variation in Cosmic Rays

That the penetrating rays from space, first observed by a German scientist, Dr. Werner Kolhoerster, and recently studied by Dr. R. A. Millikan, of the Norman Bridge Laboratory, Pasadena, Calif., undergo a daily variation is shown by experiments recently completed by Dr. Kolhoerster in Switzerland. These studies, which were conducted on the Jungfrau glacier, and in other mountainous regions, were made with the assistance of Dr. Gubert von Salis.

As a result of Dr. Millikan's observations, it was supposed that these rays, which are very short vibrations, similar to ordinary light and X-rays but far shorter than either, came in equal quantities from all regions of space, so that their intensity was the same at night as by day. But the new experiments show that they vary, not with the position of the sun, but with the aspect of the heavens. When the Milky Way is most nearly overhead, the intensity of the rays comes to a maximum. When the constellations of Hercules and Andromeda are best placed, the intensity is greater than at other times. This shows, in the opinion of the experimenters, that although the rays come from all parts of space, the chief centers of the rays that reach the earth are the Milky Way, and the constellations of Andromeda and Hercules.

The center of radiation in the constellation of Andromeda seems to be the great spiral nebula, which Dr. Edwin Hubble, astronomer at the Mt. Wilson Observatory in California, has shown to be a system of stars similar to that which makes up the Milky Way, and all the stars that we can see, including the sun, and which astronomers call the galaxy. It would therefore seem that Dr. Kolhoerster's and Dr. von Salis's experiments have provided a new proof of the similarity of these spiral nebulae to our galaxy.

Science News-Letter, December 18, 1926

The great tragedy of science—the slaying of a beautiful hypothesis by an ugly fact.—Huxley.

A Peruvian insect called the "traffic bug" carries a red light in its head and a green light in its tail.

It is considered likely that the islands of Japan had no human inhabitants until comparatively recent geologic times.



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